

SEQUENCE LISTING

- (1) GENERAL INFORMATION:
 - (i) APPLICANT: Margolis, Benjamin L.
 - (ii) TITLE OF INVENTION: METHODS AND COMPOSITIONS FOR TREATMENT OF BREAST CANCER
 - (iii) NUMBER OF SEQUENCES: 17
 - (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: PENNIE & EDMONDS
 - (B) STREET: 1155 Avenue of the Americas
 - (C) CITY: New York
 - (D) STATE: New York
 - (E) COUNTRY: U.S.A.
 - (F) ZIP: 10036-2711
 - (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.25
 - (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/207,575
 - (B) FILING DATE: 07-MAR-1994
 - (C) CLASSIFICATION:
 - (viii) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: Coruzzi, Laura A.
 - (B) REGISTRATION NUMBER: 30,742
 - (C) REFERENCE/DOCKET NUMBER: 7683-053
 - (ix) TELECOMMUNICATION INFORMATION:
 - (A) TELEPHONE: (212) 790-9090
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- (2) INFORMATION FOR SEQ ID NO:1:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:
 - Gly Xaa Gly Xaa Xaa Gly
- (2) INFORMATION FOR SEQ ID NO:2:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 4 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown

- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Val Ala Val Lys

- (2) INFORMATION FOR SEQ ID NO:3:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 5 amino acids

 - (B) TYPE: amino acid (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

Gly Met Xaa Tyr Leu

- (2) INFORMATION FOR SEQ ID NO:4:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 9 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Ile His Arg Asp Leu Ala Ala Arg Asn

- (2) INFORMATION FOR SEQ ID NO:5:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Lys Trp Met Ala Pro Glu

- (2) INFORMATION FOR SEQ ID NO:6:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Lys Trp Thr Ala Pro Glu
1 5

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Phe Trp Tyr Ala Pro Glu
1 5

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 7 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Ser Asp Val Trp Ser Phe Gly

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 334 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: protein
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Arg Asp Ser Ser Arg Leu Cys Val Val Lys Val Tyr Ser Glu Asp Gly
1 5 10 15

Ala Cys Arg Ser Val Glu Val Ala Ala Gly Ala Thr Ala Arg His Val 20 25 30

Cys Glu Met Leu Val Gln Arg Ala His Ala Leu Ser Asp Glu Ser Trp 35 40 45

Gly Leu Val Glu Ser His Pro Tyr Leu Ala Leu Glu Arg Gly Leu Glu 50 55 60

Asp His Glu Phe Val Val Glu Val Gln Glu Ala Trp Pro Val Gly Gly 65 70 75 80

Asp Ser Arg Phe Ile Phe Arg Lys Asn Phe Ala Lys Tyr Glu Leu Phe 85 90 95

Lys Ser Pro Pro His Thr Leu Phe Pro Glu Lys Met Val Ser Ser Cys

110 105 100 Leu Asp Ala Gln Thr Gly Ile Ser His Glu Asp Leu Ile Gln Asn Phe 120 Leu Asn Ala Gly Ser Phe Pro Glu Ile Gln Gly Phe Leu Gln Leu Arg 140 Gly Ser Gly Arg Gly Ser Gly Arg Lys Leu Trp Lys Arg Phe Phe Cys Phe Leu Arg Arg Ser Gly Leu Tyr Tyr Ser Thr Lys Gly Thr Ser Lys 170 Asp Pro Arg His Leu Gln Tyr Val Ala Asp Val Asn Glu Ser Asn Val 185 Tyr Val Val Thr Gln Gly Arg Lys Leu Tyr Gly Met Pro Thr Asp Phe Gly Phe Cys Val Lys Pro Asn Lys Leu Arg Asn Gly His Lys Gly Leu His Ile Phe Cys Ser Glu Asp Glu Gln Ser Arg Thr Cys Trp Leu Ala 235 Ala Phe Arg Leu Phe Lys Tyr Gly Val Gln Leu Tyr Lys Asn Tyr Gln 250 Gln Ala Gln Ser Arg His Leu Arg Leu Ser Tyr Leu Gly Ser Pro Pro 265 260 Leu Arg Ser Val Ser Asp Asn Thr Leu Val Ala Met Asp Phe Ser Gly 280 285 His Ala Gly Arg Val Ile Asp Asn Pro Arg Glu Ala Leu Ser Ala Ala 295 Met Glu Glu Ala Gln Ala Trp Arg Lys Lys Thr Asn His Arg Leu Ser 310 Leu Pro Thr Thr Cys Ser Gly Ser Ser Leu Ser Ala Ala Ile 330 (i) SEQUENCE CHARACTERISTICS:

(2) INFORMATION FOR SEQ ID NO:10:

- - (A) LENGTH: 348 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: protein
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Lys Glu Ala Lys Val Thr Lys Ile Phe Val Lys Phe Phe Val Glu Asp

Gly Glu Ala Leu Gln Leu Leu Ile Asp Glu Arg Trp Thr Val Ala Asp

Thr Leu Lys Gln Leu Ala Glu Lys Asn His Ile Ala Leu Met Glu Asp

His Cys Ile Val Glu Glu Tyr Pro Glu Leu Tyr Ile Lys Arg Val Tyr

60 50 55 Glu Asp His Glu Lys Val Val Glu Asn Ile Gln Met Trp Val Gln Asp 70 Ser Pro Asn Lys Leu Tyr Phe Met Arg Arg Pro Asp Lys Tyr Ala Phe Ile Ser Arg Pro Glu Leu Tyr Leu Leu Thr Pro Lys Thr Ser Asp His Met Glu Ile Pro Ser Gly Asp Gln Trp Thr Ile Asp Val Lys Gln Lys Phe Val Ser Glu Tyr Phe His Arg Glu Pro Val Val Pro Pro Glu Met 130 135 Glu Gly Phe Leu Tyr Leu Lys Ser Asp Gly Arg Lys Ser Trp Lys Lys His Tyr Phe Val Leu Arg Pro Ser Gly Leu Tyr Tyr Ala Pro Lys Ser Lys Lys Pro Thr Thr Lys Asp Leu Thr Cys Leu Met Asn Leu His Ser 180 185 Asn Gln Val Tyr Thr Gly Ile Gly Trp Glu Lys Lys Tyr Lys Ser Pro Thr Pro Trp Cys Ile Ser Ile Lys Leu Thr Ala Leu Gln Met Lys Arg Ser Gln Phe Ile Lys Tyr Ile Cys Ala Glu Asp Glu Met Thr Phe Lys 230 235 Lys Trp Leu Val Ala Leu Arg Ile Ala Lys Asn Gly Ala Glu Leu Leu Glu Asn Tyr Glu Arg Ala Cys Gln Ile Arg Arg Glu Thr Leu Gly Pro Ala Ser Ser Met Ser Ala Ala Ser Ser Ser Thr Ala Ile Ser Glu Val 280 Pro His Ser Leu Ser His His Gln Arg Thr Pro Ser Val Ala Ser Ser 295 Ile Gln Leu Ser Ser His Met Met Asn Asn Pro Thr His Pro Leu Ser 315 Val Asn Val Arg Asn Gln Ser Pro Ala Ser Phe Ser Val Asn Ser Cys 330 325 Gln Gln Ser His Pro Ser Arg Thr Ser Ala Lys Leu

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

340

- (A) LENGTH: 111 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: protein

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 1, 25-27, 32, 46, 47, 49, 52, 54, 72 75, 77, 93, 95, 105, 107, 108 and 111 (D) OTHER INFORMATION: /label= Xaa
- /note= "Xaa at these positions = Hydrophobic residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 2, 21, 23 and 101
 (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Basic residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 3, 7, 9, 11-19, 22, 28-31, 36-42, 44, 48 50, 51, 53, 55-70, 74, 76, 78-90, 92, 94 96-98, 106 109 and 110
- (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Non-consensus residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
- (B) LOCATION: 24, 33-35 and 91
- (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Aromatic residues"

(ix) FEATURE:

- (A) NAME/KEY: Modified-site
 (B) LOCATION: 99, 100, 102 and 103
 (D) OTHER INFORMATION: /label= Xaa
- /note= "Xaa at these positions = Acidic residues"
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:
- Xaa Xaa Xaa Gly Phe Leu Xaa Lys Xaa Gly Xaa Xaa Xaa Xaa Xaa Xaa
- Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Pro Xaa Gly Xaa Xaa Xaa 40
- Xaa Xaa Xaa Xaa Xaa Xaa Asn Xaa Phe Xaa Xaa Xaa Xaa Xaa Xaa
- 90
- Xaa Xaa Xaa Xaa Xaa Xaa Trp Xaa Xaa Xaa Xaa Xaa Xaa Xaa 100 105

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 111 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown

- (ii) MOLECULE TYPE: protein
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 (B) LOCATION: 1

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Isoleucine or Valine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 2, 69 and 102
 - /note= "Xaa at these positions = Arginine or Lysine" (D) OTHER INFORMATION: /label= Xaa
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 5
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Tyrosine or Tryptophan"
- (ix) FEATURE:

 - (A) NAME/KEY: Modified-site
 (B) LOCATION: 7, 11-17, 22, 28, 29, 31, 33, 35, 38-42 46, 47, 50-52, 58-68, 70, 72, 74, 76-78 80-92, 96, 98, 109, 110 (D) OTHER INFORMATION: /label= Xaa
 - /note= "Xaa at these positions = Non-consensus residues"
- (ix) FEATURE:

 - (A) NAME/KEY: Modified-site
 (B) LOCATION: 8, 9, 18 and 21
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Lysine or Arginine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 19
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Threonine or Serine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 24
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Tryptophan or Tyrosine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 26 and 57
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Valine or Isoleucine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 30
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Aspartic Acid or Glycine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site(B) LOCATION: 34

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Leucine or Tyrosine"

- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 36
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Tyrosine or Phenylalanine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 37
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Lysine or Glutamic Acid"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site(B) LOCATION: 55

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Cysteine or Valine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 56
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Glutamine or Glutamic Acid"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 71
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Asparagine or Histidine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site(B) LOCATION: 75 and 108

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Isoleucine or Leucine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 93
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Phenylalanine or Leucine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 (B) LOCATION: 94

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Glutamine or Alanine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 97
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Serine or Threonine"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 102 and 103
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa at these positions = Glutamic Acid or Aspartic Acid"
- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 105
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Valine or Methionine"

- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 (B) LOCATION: 111

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Alanine or Valine"
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Ile Arg Glu Gly Tyr Leu Xaa Lys Lys Gly Xaa Xaa Xaa Xaa Xaa Xaa

Xaa Lys Thr Trp Lys Xaa Arg Trp Phe Val Leu Xaa Xaa Asp Xaa Leu

Xaa Leu Xaa Tyr Lys Xaa Xaa Xaa Xaa Pro Lys Gly Xaa Xaa Pro

Leu Xaa Xaa Xaa Ser Val Cys Gln Val Xaa Xaa Xaa Xaa Xaa Xaa

Xaa Xaa Xaa Arg Xaa Asn Xaa Phe Xaa Ile Xaa Xaa Xaa Asp Xaa

Ser Xaa Glu Glu Arg Glu Glu Trp Val Lys Ala Ile Xaa Xaa Ala

- (2) INFORMATION FOR SEQ ID NO:13:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 6 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Asp Leu Arg Ala Ala Asn

- (2) INFORMATION FOR SEQ ID NO:14:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 8 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 2
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Isoleucine or Valine"
 - (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 3
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Lysine or Arginine"

- (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 5
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Threonine or Methionine"
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Pro Xaa Xaa Trp Xaa Ala Pro Glu

- (2) INFORMATION FOR SEQ ID NO:15:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 7 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (ix) FEATURE:
 - (A) NAME/KEY: Modified-site(B) LOCATION: 5

 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Valine or Isoleucine"
 - (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 7
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Valine or Isoleucine"
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Xaa Pro Xaa Tyr Xaa Asn Xaa

- (2) INFORMATION FOR SEQ ID NO:16:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 10 amino acids

 - (B) TYPE: amino acid (C) STRANDEDNESS: single (D) TOPOLOGY: unknown
 - (ii) MOLECULE TYPE: peptide
 - (ix) FEATURE:
 - (A) NAME/KEY: Modified-site
 - (B) LOCATION: 8
 - (D) OTHER INFORMATION: /label= Xaa /note= "Xaa = Hydrophobic Residue"
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Xaa Pro Xaa Xaa Pro Pro Pro Xaa Xaa Pro

- (2) INFORMATION FOR SEQ ID NO:17:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 7 amino acids
 - (B) TYPE: amino acid

- (C) STRANDEDNESS: single
 (D) TOPOLOGY: unknown
- (ii) MOLECULE TYPE: peptide
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Pro Pro Val Pro Pro Arg Arg 1